

Supplemental Material

Comparison of Trihalomethanes in Tap Water and Blood:

A Case Study in the United States

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Supplemental Material, Table 1. Characteristics based on first 24-hour water use diary data of a study population (n = 150) recruited from three metropolitan areas in the U.S. during 2004 and 2005.

			Water	Shower/Bathing	Bathing	ΣTHM	ΣTHM
Population			Intake	Self	Children	Blood	Water
Characteristics	<i>n</i>	%	(L)	(minutes)	(minutes)	(ng/L)	(μg/L) ^a
Total population	150	100	0.90	16.4	8.5	18.7	17.2
Maternal race/ethnicity							
Nonhispanic white	104	69.3	0.98	13.4	8.3	18.7	17.0
Nonhispanic black	19	12.7	0.86	28.1	7.1	16.3	15.7
Hispanic	12	8.0	0.46	22.3	7.1	23.7	16.3
Other	7	4.7	0.63	15.2	6.7	18.5	17.4
Missing	8	5.3	0.74	18.9	18.8	19.0	29.0
Maternal age (years)							
< 25	24	16.0	0.67	28.3	5.4	17.5	14.6

Supplemental Material, Table 1 (cont.)

			Water	Shower/Bathing	Bathing	ΣTHM	ΣTHM
Population			Intake	Self	Children	Blood	Water
Characteristics	<i>n</i>	%	(L)	(minutes)	(minutes)	(ng/L)	(μg/L) ^a
25–29	52	34.7	0.69	15.0	6.6	20.1	18.2
30–34	49	32.7	1.20	12.7	6.9	19.7	17.3
≥ 35	17	11.3	1.20	12.5	18.5	14.2	14.4
Missing	8	5.3	0.74	18.9	18.8	19.0	29.0
Highest maternal education level							
High school or less	22	14.7	0.68	27.0	12.2	24.2	20.4
Some college	30	20.0	0.91	16.8	16.4	20.7	13.9
College degree or higher	90	60.0	0.96	13.5	13.5	17.0	17.1
Missing	8	5.3	0.74	18.9	18.8	19.0	29.0

Supplemental Material, Table 1 (cont.)

			Water	Shower/Bathing	Bathing	ΣTHM	ΣTHM
Population			Intake	Self	Children	Blood	Water
Characteristics	<i>n</i>	%	(L)	(minutes)	(minutes)	(ng/L)	(μg/L) ^a
Maternal smoking ^b							
Yes	7	4.7	1.2	33.9	4.9	19.9	18.5
No	135	90.0	0.9	15.3	8.1	18.6	16.7
Missing	8	5.3	0.74	18.9	18.8	19.0	29.0
Post-pregnancy BMI							
< 19.8	9	6.0	0.65	14.3	6.7	22.1	28.0
19.8–25.9	57	38.0	0.94	15.4	7.9	19.7	12.8
26.0–29.9	19	12.7	0.72	15.3	2.4	16.8	20.4
> 29.9	34	22.7	1.10	17.4	10.7	19.6	20.0
Missing	31	20.7	0.77	18.4	11.4	16.5	19.8

Supplemental Material, Table 1 (cont.)

			Water	Shower/Bathing	Bathing	ΣTHM	ΣTHM
Population			Intake	Self	Children	Blood	Water
Characteristics	<i>n</i>	%	(L)	(minutes)	(minutes)	(ng/L)	(μg/L) ^a
Marital status							
Married	117	78.0	0.9	14.9	8.0	18.8	17.4
Not married	25	16.7	0.92	22.2	7.4	18.1	14.1
Missing	8	5.3	0.74	18.9	18.8	19.0	29.0
Parity							
Nulliparous	82	54.7	0.95	17	9.9	17.4	19.7
Parous	60	40.0	0.85	15.1	5.3	21.1	19.3
Missing	8	5.3	0.74	18.9	18.8	19.0	29.0
Household income (\$)							
< 30,000	31	20.7	0.94	21.5	7.8	21.1	16.5

Supplemental Material, Table 1 (cont.)

			Water	Shower/Bathing	Bathing	ΣTHM	ΣTHM
Population			Intake	Self	Children	Blood	Water
Characteristics	<i>n</i>	%	(L)	(minutes)	(minutes)	(ng/L)	(μg/L) ^a
30,001–60,000	41	27.3	0.86	16.2	8.4	22.3	19.0
60,001–80,000	34	22.7	0.73	16.1	6.9	15.7	17.1
> 80,000	35	23.3	1.1	11.9	8.7	16.5	14.4
Missing	9	6.0	0.65	17.4	16.7	17.8	29.0
Study site							
Site 1	70	46.7	0.86	14.9	9.6	23.1	24.8
Site 2	49	32.7	0.99	17.1	7.7	12.6	4.8
Site 3	31	20.7	0.81	18.3	7.3	23.5	24.8
Water consumption ^c							
Tap water	106	71	0.95	16.4	9.0	19.8	28.4

Supplemental Material, Table 1 (cont.)

			Water	Shower/Bathing	Bathing	ΣTHM	ΣTHM
Population			Intake	Self	Children	Blood	Water
Characteristics	<i>n</i>	%	(L)	(minutes)	(minutes)	(ng/L)	(μg/L) ^a
Bottled water	8	5.3	0.64	15.2	7.0	21.1	27.1
Tap and bottled water	36	23.7	1.2	13.7	8.1	24.7	32.1

Abbreviations: THM, trihalomethane; TCM, chloroform; BDCM, bromodichloromethane; DBCM, dibromochloromethane; TBM, bromoform; ΣTHM, sum of TCM, BDCM, DBCM, and TBM. ^aNine water samples were not examined due to unacceptable headspace volume and/or freezing of vials. ^bAny smoking during pregnancy. ^cSample size reflects exclusive use of tap water, exclusive use of bottled water, or a combination of tap and bottled water. All variables reflect demographic characteristics during pregnancy except for post-pregnancy BMI. Blood and water THM concentrations below the limit of detection (LOD) were replaced with LOD/√2 for the analysis.

Supplemental Material, Table 2. Spearman correlation coefficients for blood and tap water THM concentrations by site and season.

THMs	Overall	Site 1			Site 2 ^a	Site 3 ^b
	(n = 150)	Overall (n = 97)	Winter (n = 47)	Summer (n = 50)	(n = 49)	(n = 29)
ΣTHM	0.36*	0.12*	0.03	−0.25	−0.04*	0.51*
TCM	0.37*	−0.02	−0.14	−0.24	−0.05	0.57*
BDCM	0.62*	0.29*	0.45*	−0.33*	0.26*	0.57*
DBCM	0.53*	0.44*	0.51*	−0.11	0.45*	0.33
TBM	0.54*	0.09	−0.23	0.07	0.14*	0.38*
Brominated THMs	0.53*	0.35*	0.44*	−0.20	0.20*	0.44*

Abbreviations: ΣTHM, sum of TBM, TCM, BDCM, and DBCM; TBM, bromoform; TCM, chloroform; BDCM, bromodichloromethane; DBCM, dibromochloromethane; brominated THMs, sum of BDCM, DBCM, and TBM. ^aAll samples in Site 2 were collected during summer. ^bOnly six samples in Site 3 were collected during summer. Concentrations below the limit of detection (LOD) were replaced with LOD/√2 for the analysis. *P-value for the Spearman rank correlation: $p < 0.05$.

Supplemental Material, Table 3. Blood Σ THM linear regression coefficients (per ng/L change) for different covariates among the study population ($n = 142$).

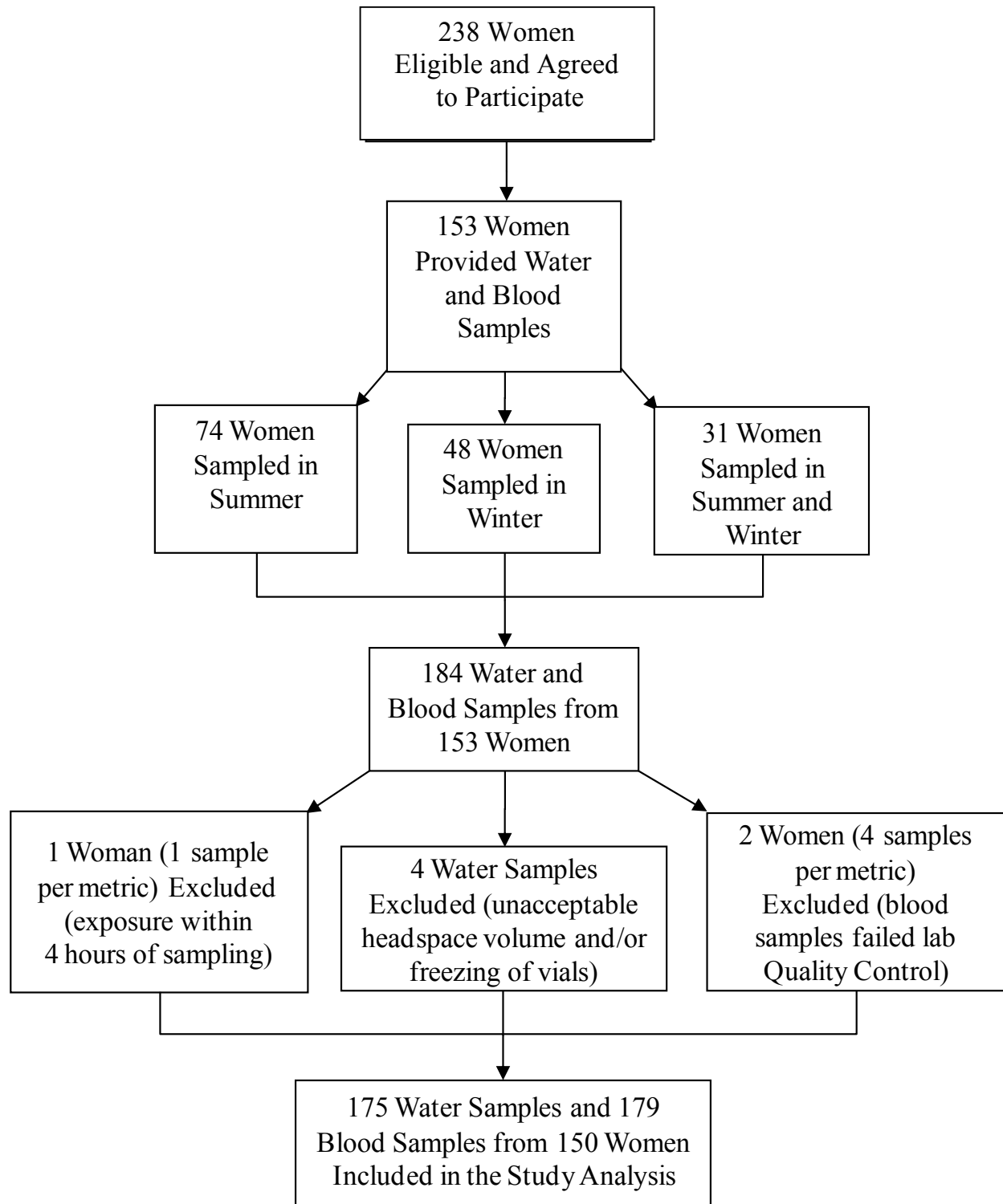
Variables	Multivariate		Multivariate
	Univariate	Model 1 ^a	Model 2 ^b
	β (SE)	β (SE)	β (SE)
	(ng/L)	(ng/L)	(ng/L)
Σ THM water concentration ($\mu\text{g/L}$)	0.206 (0.05)***	0.193 (0.05)***	0.190 (0.06)**
Age (years)	0.025 (0.07)	0.003 (0.08)	−0.045 (0.06)
Race/ethnicity ^c	0.029 (0.07)	−0.018 (0.08)	0.001 (0.09)
Education level ^d	−0.239 (0.08)**	−0.245 (0.11)**	−0.219 (0.12)*
Smoking (yes/no)	0.010 (0.28)	0.039 (0.34)	0.062 (0.35)
Pre-pregnancy BMI ^e	0.004 (0.06)	0.004 (0.07)	0.078 (0.07)
Marital status ^f	−0.403 (0.17)*	−0.476 (0.23)**	−0.418 (0.24)*
Income ^g	−0.094 (0.06)	−0.068 (0.08)	−0.080 (0.08)
Season ^h	−0.014 (0.13)	−0.015 (0.16)	−0.015 (0.17)
Site 1 vs. Site 2	0.021 (0.09)	0.023 (0.07)	0.023 (0.08)

Supplemental Material, Table 3 (cont.)

Variables	Univariate	Multivariate Model 1 ^a	Multivariate Model 2 ^b
	β (SE)	β (SE)	β (SE)
Site 1 vs. Site 3	0.034 (0.08)	0.051 (0.10)	0.048 (0.10)
Noningestion metric (minute/day)	0.002 (0.001)	0.002 (0.004)	—
Ingestion metric (L/day)	0.011 (0.01)	< 0.001(0.002)	—
Shower/Bathing (minute/day)	−0.001 (0.01)	—	−0.003 (0.006)
Children bath (minute/day)	0.003 (0.004)	—	0.007 (0.007)
Post-shower/bath bathroom time (minute/day)	0.005 (0.0001)	—	0.001 (0.005)
Dishwashing by hand (minute/day)	< 0.001 (0.001)	—	0.000 (0.009)
Swimming (minute/day)	0.007 (0.01)	—	0.001 (0.01)
Tap water intake (L/day)	−0.034 (0.08)	—	0.403 (0.09)

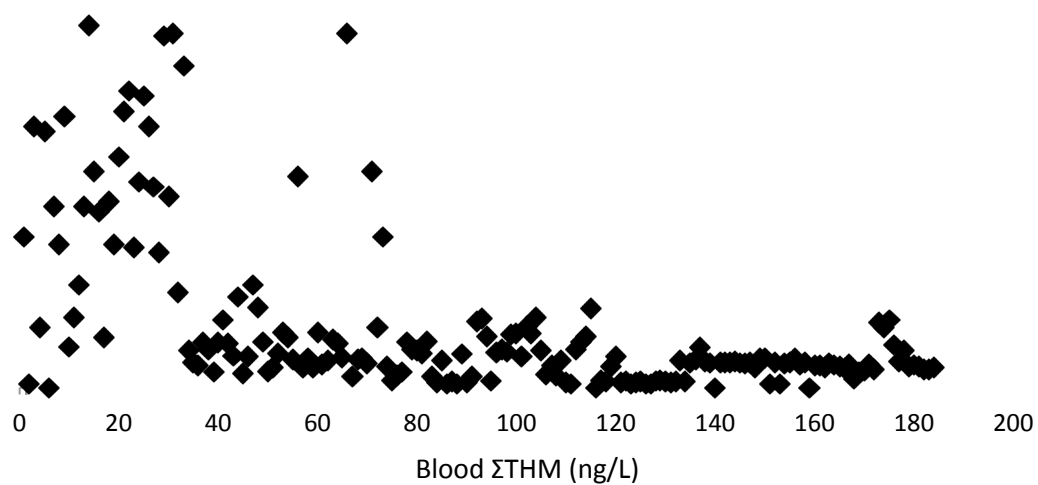
Abbreviations: SE, standard error. ^aIngestion vs. noningestion metrics. ^bIndividual activities. ^cNonhispanic white vs. all other races combined. ^dSome college or higher vs. high school or less. ^eBody Mass Index before pregnancy (continuous). ^fReference group is

“Married”. ^sUS\$ (continuous). ^hWinter vs. summer. Concentrations below the limit of detection (LOD) were replaced with LOD/ $\sqrt{2}$ for the analysis. Two-tailed p -value for t-statistics: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.001$.



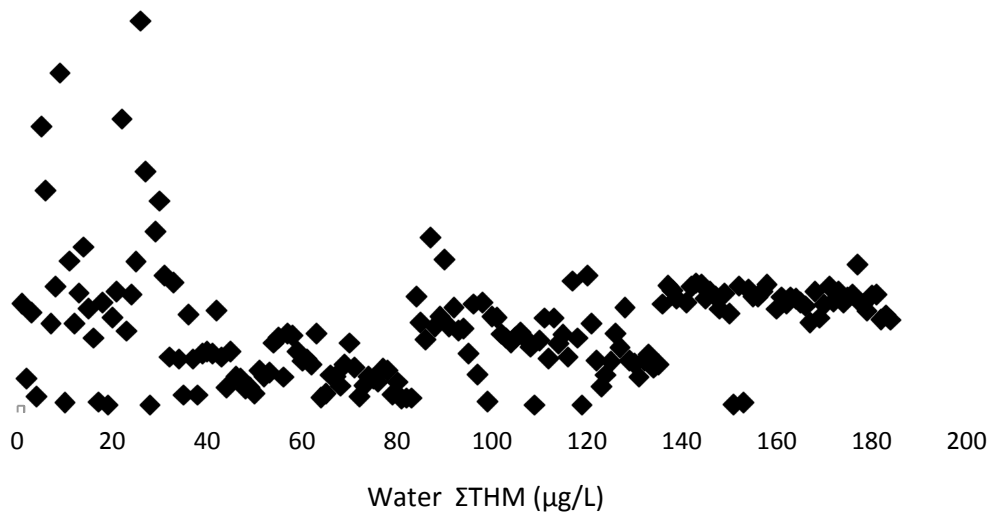
Supplemental Material, Figure 1. Study population based on blood, water, and questionnaire data inclusion criteria.

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Supplemental Material, Figure 2. Distribution of blood ΣTHM concentrations.

□



Supplemental Material, Figure 3. Distribution of water ΣTHM concentrations.